

M/40009-US

= EP 411400

91-038334/06

A97 F09 (A14)

FARB 01.08.89

A(5-F, 5-J7, 12-W6C) F(5-A2C, 5-A6C)

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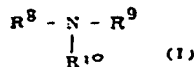
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01.08.89-DE-925439 (06.02.91) C08g-69/48 C08g-73/02

Basic condensates for use in paper-making e.g. as retention aids - prepd. by reacting amine(s) with halo-hydrocarbon polyamide:amine reaction prods.

C91-016385 R(CH DE FR GB LI)

Water-sol. basic polycondensates are claimed which are obtd. by reaction of (A) water-sol. polyamide amines of mol. wt. at least 2000 (and themselves prepd. by reaction of components (A1) and (A2) in mol ratio (A1):(A2) = 0.75-1.3:1) with (B) 0.01-0.4 mols (per mol of basic N in (A) of amino - reactive polyfunctional halo-hydrocarbons, followed by reaction of the (A):(B) reaction prod. with (C) 0.05-0.5 mols (per mol of (B)) of an amine component of formula (I).

R<sup>8</sup> = H or 1-4C alkyl; andR<sup>9</sup> and R<sup>10</sup> = 1-4C alkyl, 2-hydroxyethyl-, 2-hydroxypropyl-, 2-hydroxyethoxyethyl- or 2-hydroxypropoxypropyl-.

(A1) is a high mol. aliphatic polyalkylene-polyamine contg. at least 2 amide-forming and at least 3 further sec. or tert. amine gps.

(A2) is a 2-10C aliphatic dicarboxylic acid (or (semi)ester).

The polycondensates are pref. such that their 25-50 wt% solns have a viscosity of 50-4000 mPa.s at 25°C.

**USE/ADVANTAGE**

The use of the polycondensates is claimed in papermaking esp. as retention aids but also as dewatering accelerators or as flocculants for waste water from papermaking. The polycondensates are of low viscosity and they are insensitive to the impurities which build up during papermaking, being usable over a wide pH range and being prepd. using only small amts. of crosslinker.

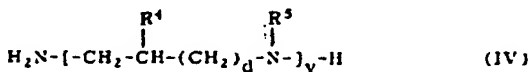
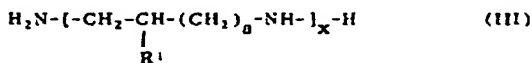
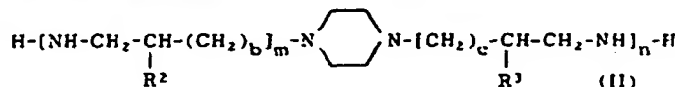
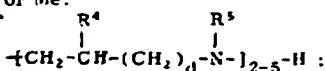
**PRODUCTS**

The polycondensates pref. have mol. wt. 2000-20,000.

**STARTING MATERIALS**

Polyalkylene polyamines (A1) are pref. N-aminoalkyl-piperazine derivs. of formula (II) or polyamines of formula (III) or (IV).

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R<sup>1-4</sup> = H or Me;R<sup>5</sup> = H or

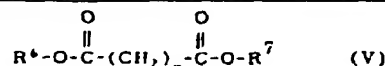
a-d = 0 or 1;

x and y = 3-25 with y pref. being only 3;

m = 1-20; and

n = 0-20, eg. 2-20.

Dicarboxylic acid ((semi)ester) (A2) is pref. of formula (V)

R<sup>6</sup> and R<sup>7</sup> = H or 1-4C alkyl; and

e = 0-8.

Typical examples of (A2) include succinic acid, glutaric acid, adipic acid, sebacic acid, di-Et succinate and di-Et sebacate.

Prepd. halo-hydrocarbons (B) are of formula (VI)



X and Y = Cl, Br or I; and

m = 2-6C alkylene or xylene.

**PREPARATION**

Esp. prefd. mol ratios are: (A1):(A2) = 0.9-1.15:1; (B):N in (A) = 0.05-0.15; and (C):(B) = 0.05-0.5:1.

**EXAMPLE**

A polycondensate giving good papermaking dewatering at levels of 0.1, 0.2 and 0.4% at pH 5 or 7 was obtd. by reacting 2000g of a 50% soln of a polyamideamine (prepd. from 560kg adipic acid and 1374 kg of a mixt. of

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pentaethylenhexamine and higher polyethyleneamines) and 3000 ml water at 125°C with 80g 1,2-dichloroethane which had been added over 9/4 hrs. followed after 10 mins. by reaction at 120°C for 30 mins. with 9.6g N-Me-diethanolamine and 450 ml water.

The prod. had solids content = 38%; viscosity = 990 mPa.s (25°C); and pH = 9.1. (11pp1958PADwgNo0/0).

(C)ISR: No Search Report.

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